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professor.—Dr. N. L. Britton has described and figured the remains of a supposed plant from the white crystalline limestone (Archæan) of Sussex Co., New Jersey. He names it *Archæophyton newberryanum*, and gives a good plate. The paper appeared in the *Annals of the New York Academy of Sciences*, Vol. IV., No. 4. —The microscopical anatomy of the common cedar apple (*Gymnosporangium macropus*) has been investigated by Elmer Sanford (in the Botanical Laboratory of the University of Michigan), the results of which appeared as a paper in the February number of the *Annals of Botany*.—Dr. Farlow has added to his list of works on North American Fungi by the publication of nearly one hundred additional titles, in No. 30 of the *Bulletins of Harvard University Library*.—In Professor Trelease's study of the North American Geraniaceæ (*Memoirs Boston Society Nat. Hist.*, Vol. IV.) the author has brought together descriptions of our species of the order, with biological notes, references to their pollination, dissemination, etc. Four good plates aid in giving to the monograph greater value.

## ZOOLOGY.

NORTH AMERICAN INFUSORIA.—Dr. A. C. Stokes has done students of the Infusoria good service in collecting together in his "Preliminary Contribution toward a History of the Fresh-water Infusoria of the United States" (*Journal Trenton Nat. Hist. Soc.*, vol. i., pp. 71–344, pls. xiii., 1888), an extended catalogue of all the known species in the United States. Even his own papers appeared in so many places that it was rapidly becoming impossible to keep track of them all. In the present catalogue 351 species are enumerated, distributed as follows:—

Flagellata.....	153
Monadina.....	27
Euglenoidea.....	46
Heteromastigoida.....	20
Isomastigoida.....	24
Choano-flagellata.....	30
Dino-flagellata.....	3
Cilio-flagellata.....	3
Ciliata.....	268
Holotricha.....	58
Heterotricha.....	29
Peritricha.....	122
Hypotricha.....	59
Suctoria.....	30

It will be noticed that Dr. Stokes accepts both the Cilio- and the Dino-flagellata, contrary to the recent classifications. His reasons

are that while there is a second flagellum in some of the Peridinidæ, in others of the old group of Cilio-flagellates there are true cilia in the equatorial groove or scattered over the surface of the body, and hence the group must be retained. It is interesting to note that while Dr. Stokes has given names to nearly 250 new species of Infusoria in his various papers, he has carefully refrained from adding to the number in the present contribution.

TWO CASES OF SYMBIOSIS.—Dr. C. P. Sluiter notices two instances of "mutualismus" as occurring in the seas of Batavia. In shallow water there is found a large sea anemone (*Actinia*) abundant on the dead coral. It spreads a disc sometimes sixteen inches across, the disc, tentacles and body being colored of various shades of purple. Swimming in and out among the tentacles of this actinia are usually found two or more small species of fish identified as *Trachichthys tunicatus*. These seem to suffer not the least harm from the coelenterate nettle cells, but rather to seek protection from enemies among the tentacles. In one case, Dr. Sluiter removed several fish from their protector and placed them in an aquarium with several larger fishes. The little ones tried their best to hide among the corals and the spines of the echinoderms, but soon fell victims to the appetites of their cousins. Others placed under similar conditions, but in company with anemones, survived for over half a year. They prove very timid, and rarely venture but a short distance from home. Their food is mostly the droppings from the Actinians table.

The second case, also noticed by Sluiter, occurs between *Bunodes* and *Trachichthys clarkii*. In this instance but a single fish has been found with each anemone, but this, as it is larger than its relative, ventures farther from home in search of food. In case a bit of food be dropped near the *Bunodes*, the fish darts out and, when it is about eight inches away, seizes the morsel, which may be half as large as itself, and quickly darts back to the hiding-place. Then the fish jerks the meat against the tentacles, and when these have grasped it, the fish tears it in shreds, some of which are small enough to be swallowed. In case the actinian has swallowed the morsel before the fish has had its fill, the latter darts into the stomach and brings out the matter, and proceeds to tear it to pieces as before.

EARTH-WORMS.—N. Kulagin communicates (*Zool. Anzeiger* xi., 231) some observations on Russian Earth-worms which are worthy of note. The cuticle, composed of H, C, O and N, is not a true chitin, but might be called a precursor of it. It dissolves readily in weak hydrochloric and other acids, and to prevent this effect by the humus acids in which the worm lives, the ectodermal glands secrete an alkaline fluid. The egg cocoons differ much, as they withstand strong acids and pepsin. The fluid of the mouth and

pharynx has an alkaline reaction, and converts starch into sugar and fibrin into peptone. The calc-glands also alter starch. The gastric juice is much like pancreatic juice, but is distinguished by the presence of tripsin, and by the fact that it apparently works better in the presence of weak acids. The cells of the typhlosole not only absorb the digestive juices, but they also have a digestive function much like that of the pancreas of the Vertebrates. Other observations relate to the histology of the epidermis, the pigment material, the œsophageal muscles and the calc glands. Some notes are made on the distribution of the Russian species, two of which occur even in the Lena Delta.

RECENT NOTES ON SCAPHIOPUS HOLBROOKII.—The general characteristics of this animal have been long and familiarly known and its more prominent anatomical features clearly defined; but its rather circumscribed distribution and comparative rarity, even where known to exist, have made somewhat difficult any extensive study of its peculiar nature and habits.

A summer on Martha's Vineyard, and the occasion of a sudden and tremendous rainfall, afforded an opportunity for certain very interesting observations.

If the literature of the subject is any indication as to its familiarity, the submission of the following notes may not seem a work of supererogation; for, aside from the studies of Dr. Chas. C. Abbott, published in Vol. XVIII, No. 11, of the AM. NATURALIST, and those of Colonel Nicolas Pike, published in Vol. I, No. 7, of the *Bulletin of the American Museum of Natural History*, I have not been able to find anything except brief notes, scattered in miscellaneous works, though I believe notes on its occurrence have been made by Mr. Nichols and by Mr. Fred. S. Smith.

My observations, as will be seen, add but little that is *new*; yet a record of them may contribute somewhat to corroborate and extend that which does exist.

One afternoon, about August 10, 1887, while at work in the laboratory of the Martha's Vineyard Summer Institute, in company with Dr. H. W. Conn, Professor L. W. Chaney, and others, a very sudden and torrential rainstorm occurred, lasting some two hours or more. During an interval of cessation our attention was diverted by weird, plaintive sort of cries, which none at first was able to explain. Darting out through the still-falling rain toward a low sort of hollow, from which the cries seemed to come, it was found to have been converted into quite a pond, though previously quite dry. In this, and swimming about in a state of the greatest activity and excitement, were what looked to be scores of toads. No difficulty was found in securing a few specimens, which were at once identified as "spadefoots." Procuring a scoop-net, we took several dozens of them, leaving many more in the pond.

This was about four o'clock in the afternoon, and they continued

their orgies till late at night. But I made careful examination the following morning, without finding a single specimen—not even a sign of one. In the water I found plenty of the spawn attached to grass and floating in strings, loosely attached to weeds—a fact which clearly indicated the purpose of their presence and peculiar excitement.

On account of the pressure of other studies, I was not able to watch the development of the eggs. Indeed, I doubt whether they ever hatched, as the pond was nearly dry before the close of the following day, and the soil, being of the loose sandy drift peculiar to that locality, would not certainly retain water for sufficient time for the growth of the tadpole—if, indeed, for the hatching of the eggs, though, as to this last, I cannot say, as I left before it could have occurred.

This characteristic of the spawning habit is certainly peculiar, and seems somewhat difficult to explain. First, the lateness of the season is remarkable. It is said that a related European species breeds twice a year. Can it be possible that such is the case with *Scaphiopus*? There are some facts which seem to indicate that it might be, though it is hardly probable. Second, the places of spawning is still more remarkable. From the observations of Dr. Abbott and Colonel Pike, as well as my own, the choice seems to be for some temporary sink-hole or surface-pond. If the conditions for development in these places from speedy drainage, etc., were not so utterly precarious, it might be thought a shrewd precaution for evading the natural enemies common in the more permanent ponds and bogs. Altogether, the case seems to be quite anomalous.

But to refer again to the adults in the pond: There they were by scores. Whence had they come, and in such numbers? In all probabilities, from the ground of the bordering hillsides and environs. But not a single specimen was seen out of the water, and that, too, notwithstanding we were at the pond almost immediately following their first coming. If they had come from any tolerable distance, it would seem that some late-comers would have been detected. Again, their retreat must have been almost as sudden as their appearance. I passed the pond about ten o'clock at night, and the air was perfectly vocal with their never-to-be-forgotten notes. I went to the pond early the following morning, but all was silent and deserted. Had they returned to the ground? Such seems the most probable explanation. Yet so carefully had they covered the retreat that not the slightest trace could be found.

Furthermore, their appearance itself seems to be capricious and phenomenal. I made inquiries of persons of observant habits as to any previous occurrence in the vicinity, but was not able to find any account of them.

It has been suggested that they are, doubtless, nocturnal in habit, and that this explains, in a measure, their comparative rarity, even where known to exist. I have no hesitancy in assenting to the

nocturnal habit. It is quite in keeping with the habit of many of the order; and the vertical pupil of the eye points likewise to the same fact. This, however, in itself, must be a comparatively small factor in the case, and, alone, would hardly insure it against frequent detection any more than does a similar habit in many other nocturnal animals. I had gone by this hollow repeatedly, night after night, both before and after this appearance, and, though constantly on the alert to notice anything of the sort, had no hint of their presence.

Doubtless, the solitary burrowing habit goes much further in explaining its seclusion. But even this would be inadequate, unless the animal persistently avoided all open and cultivated grounds. Such, only, would protect it against frequent exposure by the spade or plow.

Altogether, they are certainly the most peculiar and erratic of any of the order; and, under the peculiar difficulties in the way of continuous study, it will be long ere its life-history can be said to be thoroughly known. However, the very difficulties add a charm to the investigation, which we may hope will lead to success. To me, the brief research herein outlined has been full of the liveliest interest, and, while but a mite toward the solution of the problem, I shall hope that it may not be without some value when a final summary is made.—*C. W. Hargitt, Moore's Hill, Ind.*

THE RELATIVE WEIGHT OF THE BRAIN TO THE BODY IN BIRDS. — In a former number of the *AMERICAN NATURALIST*,<sup>1</sup> notice was made of the relative weight of the brain to the body in *Spizella socialis*, and *Regulus satrapa* compared to that of man. Since that time more extended investigation has been made, with a view of ascertaining the relative weight of the brain to the body in different species of birds, the result of which is appended below.

An interesting fact developed from these figures is that there is considerable individual variation in the weight of the body and brain in different individuals of the same species;<sup>2</sup> this is no doubt dependent in some way upon the time of year, the amount of food supply, and individual idiosyncrasy;<sup>3</sup> there is no sexual distinction in regard to the relative weight of the brain to the body—but, on the contrary, male and female alike offer marked degrees of fluctuation in this regard. Exception, however, exists in the two specimens of different sexes of *Harporhynchus rufus*, which closely coincide in their relative weights.

Most of the specimens considered here were taken at Grand Crossing, Illinois, the remaining ones in Chicago. Light loads of

<sup>1</sup> Vol. xxi., April, 1887, p. 389.

<sup>2</sup> Notice especially the series of weights of *Dendroica aestiva*.

<sup>3</sup> Notice a specimen of *Dendroica aestiva*, taken June 4th, which weighed more in body and brain than any specimens of the same species taken before that date.

the so-called "dust" shot was used in shooting the specimens, which, as soon as they were killed, were placed in a cool place, and weighed within a few hours afterwards. It takes twelve of these dust shot, by actual count, to equal a grain weight, and advantage of this fact was taken into account in estimating the weight of the shot that passed through the skin of the specimens, and subsequently deducting this after the weights of the individual had been taken. This was obviously of little importance in the ultimate result; however, every precaution was taken to avoid errors. The weight of the brain and body are given separately, and the relative weight of the former to the latter, all the weights being designated in grains, as a matter of simplicity. In the weighing of the specimens the bird with all its parts intact was laid upon the scale-pan of a prescription scale similar to those used in apothecary stores, which weigh accurately to half of a grain. After being weighed and noted, the brain of the specimen was carefully removed<sup>1</sup> by making a circular incision, and the removal of the piece of bone, thereby cut free, from the posterior part of the cranium by means of a small scalpel. The opening that remains after the operation being sufficiently large to admit of the withdrawal of the entire encephalon after the optic nerves have been severed and the spinal cord likewise treated below the medulla oblongata. After the brain was removed in this way it was weighed upon a more delicate saddle-back scale, which weighed accurately as low as the tenth of a grain. Forty-seven birds were thus weighed, and for purpose of comparison with some small mammals four adult specimens of the common house mouse, *Mus musculus*, and one specimen of the common gopher, *Spermophilus tredecimlineatus*, are reckoned.

Name of Specimen.	Weight of Body.	Weight of Brain.	Sex.	Relative wt. of Brain to the Body.	Date speci- men was taken, 1887.
<i>Turdus aliciae</i> .....	589½	12	♀	1-49	May 20th
<i>Turdus ustulatus swainsonii</i> .....	445	12½	♀	1-36	" "
<i>Turdus aonalaschkæ pallasii</i> ....	430	12½	.....	1-34	April 15th
" .....	420	13½	.....	1-31	" "
<i>Galeoscoptes carolinensis</i> .....	546	14½	♂	1-37	June 4th
<i>Harporhynchus rufus</i> .....	1158½	26½	♂	1-44	" "
" .....	1170	26½	♀	1-44	" "
<i>Regulus calendula</i> .....	92½	5½	♂	1-17	Oct. 5th
<i>Regulus satrapa</i> .....	97½	4½	.....	1-22	" "
<i>Parus atricapillus</i> .....	176½	10½	♂	1-17	Feb. 26th
" .....	159½	9	♀	1-17	" "

<sup>1</sup> This did not necessitate any injury to the skin, as it was removed by the regular method that is employed in the skinning of birds for scientific study.

<i>Dendroica aestiva</i> .....	151	6 $\frac{1}{4}$	♂	1-24	May 13th
“ “ .....	130	5	♀	1-26	“
“ “ .....	127	5	♀	1-25	“
“ “ .....	130	5 $\frac{1}{2}$	♂	1-23	May 20th
“ “ .....	138 $\frac{1}{2}$	6 $\frac{1}{2}$	♀	1-21	“
“ “ .....	137 $\frac{1}{2}$	6	♀	1-22	“
“ “ .....	167	7	♀	1-24	June 4th
<i>Dendroica maculosa</i> .....	136 $\frac{1}{2}$	5 $\frac{1}{2}$	♂	1-25	May 13th
“ “ .....	107	5 $\frac{1}{4}$	♂	1-20	“
“ “ .....	122	5 $\frac{1}{4}$	♀	1-21	May 20th
<i>Dendroica Blackburniae</i> .....	134	5 $\frac{1}{2}$	♀	1-24	“
<i>Seiurus aurocapillus</i> .....	255	10 $\frac{1}{4}$	♀	1-25	May 13th
“ “ .....	264	11	♀	1-24	May 20th
<i>Setophaga ruticilla</i> .....	59 $\frac{1}{2}$	4 $\frac{3}{4}$	♀	1-13	“
<i>Vireosylva olivaceus</i> .....	355 $\frac{1}{2}$	9	♂	1-39	“
“ “ .....	304 $\frac{1}{2}$	9	♀	1-34	“
“ “ .....	238	9 $\frac{1}{2}$	♀	1-25	“
<i>Petrochelidon lunifrons</i> .....	422 $\frac{1}{2}$	8	♀	1-53	May 21st
“ “ .....	375 $\frac{1}{2}$	8 $\frac{1}{4}$	♂	1-45	“
“ “ .....	290	8 $\frac{1}{2}$	♀	1-34	“
<i>Carpodacus purpureus</i> .....	438	13 $\frac{1}{4}$	♂	1-31	May 10th
<i>Spinus tristis</i> .....	181	7	♂	1-27	April 15th
<i>Zonotrichia leucophrys</i> .....	366	14	.....	1-26	“
“ “ .....	400	15	.....	1-26	“
<i>Spizella socialis</i> .....	173 $\frac{1}{2}$	7 $\frac{1}{2}$	.....	1-23	“
<i>Spizella pusilla</i> .....	279	11	.....	1-25	April 15th
<i>Junco hyemalis</i> .....	284	10	♀	1-28	“
<i>Melospiza fasciata</i> .....	377	12	.....	1-31	“
<i>Dolichonyx oryzivorus</i> .....	503	15 $\frac{1}{2}$	♂	1-33	May 20th
<i>Molothrus ater</i> .....	637	18 $\frac{1}{4}$	♀	1-35	May 30th
<i>Cyanocitta cristata</i> .....	1312	46	♂	1-29	June 4th
<i>Trochilus colubris</i> .....	45	1 $\frac{8.5}{10.0}$	♂	1-24	Sept. 24th
<i>Nyctala acadica</i> .....	1153	55 $\frac{1}{4}$	♀	1-21	Nov. 2d
<i>Tringa minutilla</i> .....	388 $\frac{1}{2}$	8 $\frac{1}{2}$	♂	1-45	Aug. 16th
<i>Hybrid domestic canary</i> .....	346 $\frac{1}{2}$	8 $\frac{1}{2}$	♂	1-40	“
<i>Passer domestica</i> .....	444	14	♂	1-32	“

Name of Mammal.	Weight of Body.	Weight of Brain.	Sex.	Relative wt. of Brain to the Body.	Date speci- men was taken, 1887.
<i>Mus musculus</i> .....	318	5 $\frac{1}{2}$	♀	1-58	June 6th
“ “ .....	256	6	♂	1-43	June 10th
“ “ .....	248	6	♂	1-41	June 10th
“ “ .....	295 $\frac{1}{2}$	6	♀	1-49	June 11th
<i>Spermophilus tredecimlineatus</i>	2647	35 $\frac{1}{2}$	♂	1-74	June 4th

AQUATIC RESPIRATION IN THE MUSKRAT.—During the winter of 1879–80 I spent much of my time trapping the muskrat, and had rare opportunities for studying their habits. I have frequently observed an ingenious device, to serve as an apparatus for aquatic respiration, resorted to by the animal when driven from its burrow into a pond frozen over. In attempting to cross the pond under the ice, if the pond is too wide for the muskrat to “hold its breath”



until it reaches the opposite shore, it will stop for a few moments and exhale the air which is held down by the ice. Interchange of gases takes place between the air and water, when the animal re-breathes the air and makes another start, repeating the act until the shore is reached. I do not claim this as an original observation; others than myself have noticed it. It is well known by those who have observed the phenomenon that if the ice is struck immediately above the air, and the air thus scattered into numerous bubbles, the muskrat drowns. Having noticed an account by Professor Comstock of the use, by the "water boatman" of a bubble of air for a tracheal gill,<sup>1</sup> I would call attention to this interesting feature in the physiology of respiration of the muskrat.—*W. L. Spoon, Univ. N. C.*, May 1, 1888.

ZOOLOGICAL NEWS.—CÉLÉNTÉRATES.—Dr. G. Hubert Fowler, in the fourth part of his papers on the anatomy of the Madreporaria (*Q. J. Ms.*, 1888) discusses the structure and systematic positions of the genera Madracis, Amphihelia, Stephanophyllia, Stephanotrochus, Stephanaria, Pocillopora and Seriatopora. The points made are mostly of minor importance, except that certain cells described as coral-forming (calycoblastic) cells, occurring in several genera really function to hold the mesenteries more firmly to the corallum.

ECHINODERMATA.—The number of species of Asteroids collected by the French scientific expedition to Cape Horn is thirty-eight, twenty-three of which are new, while thirty-two were not represented in the museum of the Jardin des Plantes. The number of species known from the southern point of the American continent now reaches fifty-seven. M. E. Perrier finds great variability in each species, correlated with the varying conditions under which they exist.

WORMS.—Beddard describes (*Quart. Jour. Micro. Sci.*, 1888) the anatomy of the earthworm *Allurus tetraedrus*, pointing out the features in which this genus differs from *Lumbricus* and *Allolobophora*.

MOLLUSCA.—M. H. Fol, in a recent note on striated muscular tissue among the invertebrates, acknowledges that his statement, in a previous communication, that true muscular tissue does not occur in any mollusc is erroneous, since such tissue forms a portion of the adductor muscle of *Pecten*.

M. H. de Lacaze-Duthiers, as a result of his extensive analytical studies upon the nervous system of the Mollusca, proposes a new classification of the gasteropoda, based upon the differences in the structure of the nervous centres.

<sup>1</sup> *Am. Nat.*, June, 1887.

The marine shells of Fernando Noronha, and indeed most of the marine fauna and flora, are by H. N. Ridley stated to show affinities to those of the East Indies. The species *Trochus* have a southern distribution.

CRUSTACEA.—Another part of Dr. De Man's Crustacea of the Mergui Archipelago has appeared, embracing pages 177 to 240, and plates 13 to 15. It includes the conclusion of the Grapsidæ, the Leucosoids and the major part of the so-called Anomura. The series is especially valuable from the fact that the author has had access to the types of the French carcinologists. So far the species enumerated number 135.

M. M. Chevreux and Guerne call attention to the amphipod, *Cyrtopheum chelonophilum*, a commensal of *Thalassochelys caretta*, seventy-seven specimens of which have been collected in the scientific voyages of the Prince of Monaco. This species differs from those previously known by the shortness of the antennæ, and is probably a native of both hemispheres.

After Rathke, in 1837, noticed the curious fact that the Palæmons infested by *Bopyrus* belonged exclusively to the female sex, all succeeding authors have confirmed his observations. Nevertheless, guided by previous discoveries concerning the effects of parasitic castration among certain decapodous crustaceans infested by the Rhizocephala, M. Giard last year gave forth the hypothesis that the facts noticed by Rathke were true in appearance only, and that though all the Palæmons found with *Bopyrus* seem to be of the female sex, this was really the result of the atrophy of the male organ produced by the parasites. M. Giard has recently been able to verify this supposition, both on European and other species of Palæmon.

MYRIAPODS.—C. H. Bollman publishes in a small pamphlet without indication of place of publication, a preliminary list of the Myriapods of Arkansas. Forty species are catalogued, of which nine are regarded as new.

FISHES.—Mr. George Brook (*Proc. Royal Phys. Socy. of Edinburgh*, x.) monographs the British species of the genus *Zeugopterus*, enumerating three species, *Z. punctatus*, *unimaculatus*, and *papillosus*, the last being a new species found in the Clyde.

Mr. Geo. Brook (*Proc. Roy. Soc. Edinburgh*, 1887) states that in the trout the segmental duct arises from the ectoderm. Its first appearance is in an embryo of twenty-seven days, when it forms a well-marked thickening in the middle trunk region. The lumen of the duct arises as an irregular cavity, and later the whole tube separates from the ectoderm and sinks into the intermediate cell mass. Some observations that he has made on the chick seem to indicate that a similar origin of the duct occurs in birds.

According to the observations upon the food of fresh-water

fishes, made by S. A. Forbes, and forming Article VII. of Vol. III. of the *Bull. Ill. State Lab. of Nat. Hist.*, eighty-three per cent of the food of the burbot consists of fishes, while *Esox lucius* takes ninety-nine per cent. of fishy food. *Dorosoma* feeds chiefly on fine mud containing about twenty per cent. of vegetable debris; the golden shad principally on fish; and the Catostomidæ, fifteen species of which occur in Illinois, consume molluscs and insects almost in equal ratio. The stone roller (*Hypentelium*), which in its habits simulates the Etheostomatidæ, feeds, like the members of that family, almost solely upon the larvæ of aquatic insects. The cat-fishes are nearly omnivorous, and are the only habitual scavengers among the common fishes of Illinois. *Amia* seems to feed upon Crustacea, fishes, and molluscs, with very little mixture of insect food; the gars entirely on fishes; and the singular *Polyodon* chiefly upon minute insects and crustaceans, especially the former. Professor Forbes thinks it probable that *Polyodon* employs its paddle-like snout to stir up the weeds as it advances along the muddy bottom, thus driving the animal forms within reach of its branchial strainer, while the mud and vegetation have time to settle.

Though in the deep-sea fish-fauna no distinct bathymetrical zones, characterized by peculiar forms, can, according to the "Report on the Scientific Results of the Voyage of H. M. S. Challenger," be defined, the abundance of fish-life decreases with the depth, as is shown by the number of species (232) found between 100 and 300 fathoms, as compared with 142 between 300 and 500 fathoms, 7 between 500 and 700, 56 between 700 and 1500, 24 between 1500 and 2000, and 23 below 2000 fathoms.

Partially grown examples of several species of freshwater fishes have recently been successfully introduced into Chili from France. The principles followed in arranging the methods for this long transport, involving five changes previous to the accommodation of the water-cylinders on the steamer *Sarata*, were as follows: (1) The preservation of the same water. (2) Absence of alimentation. (3) Refrigeration. (4) Continual circulation of air. One hundred California salmon, about twelve centimetres long, forty carp of fifteen cent., twenty tench of twelve cm, sixty eels of thirty cm, twenty barbels, and some burbot, minnows, etc., formed the consignment; out of which thirty-nine salmon, together with all the tench, carp and eels, arrived safely. Many of the other species died.

Dr. J. Brock (*Zeit. für Wissen, Zool.*, 1887), describes a singular appendage present immediately behind the anus in the Siluroid genus *Plotosus*. The apparatus in question consists of a tree-like bunch of small bladders of cavernous, and therefore, probably of erectile nature. The fishes of this genus are much feared on account of the terrible and often fatal wounds caused by their fin spines.

*Prionurus maculatus* Douglas-Ogilby is a new Australian species obtained at Port Jackson.

Dr. A. Günther (*P. Z. S.*, 1887) describes *Latilus fronticinctus* and *Platycephalus subfasciatus* from the island of Mauritius.

Among the fishes collected by Mr. C. Buckley, in Eastern Ecuador, and described by G. A. Boulenger (*P. Z. S.*, 1887), are three new species of *Pimelodus*, one of *Chætostomus*, and *Nannoglanis fasciatus*, a new genus and species of Siluridæ. Among the Characinidæ, *Parodon buckleyi*, *Pia ucina elongata*, and *Leptogoniates steindacheri*, are new, while *Sternarchus curvirostris* is a new Sternopygid.

REPTILES AND BATRACHIA.—Mr. Garman catalogues (*Bulletin Essex Inst.*, ix., p. 119) a collection of Reptiles and Batrachia collected by Dr. Edward Palmer in Texas and Mexico. In all fifty-six species, represented by several hundred specimens. The series of young forms and adults is in some cases very complete. The only new form described is *Crotalus palmeri*, from Monclova, Mexico, which the author regards as a variety of *C. tigris*, though he has not applied to it the trinomial system he advocated a few years ago.

Fred A. Lucas discourses the ever-new question, "Do snakes charm?" in the third number of the *Journal Trenton Nat. His. Soc.* He concludes that the whole effect lies in the person, and that it is no property of the snake.

The warts which appear at certain seasons upon many males of *Rana temporaria*, form the subject of a communication to the *Zeitschrift für Wissenschaftliche Zoologie*, 1887, by O. Huber.

Among the reptiles of Noronha are a species of *Amphisbæna*, a skink (*Euprepes punctatus*) and a gecko. Batrachians and fresh-water fish are absent.

According to G. B. Howes, the low rank assigned the Discoglossidæ, by Cope, receives confirmation in the distribution of the azygos veins. The same veins led him to the view that their absence in Pelodytes pointed to the Pelobatoid rather than the Discoglossoid relationship of that genus.

The collection of eleven species of Batrachia, and thirty-two forms of Reptilia, brought from Greece, Asia Minor and Grecian Islands, by E. V. Oertzen, is utilized by Dr. Boettger, to throw light upon the sources from which the Ægean Islands received their reptilian fauna. Three of the Batrachian forms are common to the islands and to the mainland on both shores of the Ægean, and may therefore be presumed to be autochthonous, while a fourth is wanting in Candia only. Seven reptiles are spread throughout, and are thus to be considered as belonging to the original stock of the islands. Ten species, otherwise common to Greece, Asia Minor and the islands, are not found in Candia, which has one species of African origin. From the west two species have spread as far as Candia, and three

others have not yet reached that island. Eight forms occur only in Asia Minor and its coast islands.

M. Dollo attacks the conclusion of Dr. Baur that the Athecæ (Sphargis, etc.,) are descended from the Thecophora. He argues that if the carapace of the Athecæ is formed, as maintained by Dr. Baur, by delamination into a mosaic of the carapace of a Thecophorous ancestor, fontanelles ought to exist as in the other Chelonians, which is not the case. Moreover, the oldest genera of Athecæ were without dorsal armor. The fact that the plastron of Sphargis is more reduced than that of the other Chelonians goes indeed to show that the Thecophora cannot be descended from the Athecæ, but it does not indicate the reverse of this. Dr. Trouessart, from various considerations, inclines to the belief that the two groups have descended from a common ancestor by diverging paths.

BIRDS.—George F. Atkinson gives a preliminary catalogue of the Birds of North Carolina, consisting of a list with notes of 255 species and sub-species already observed and an appendix enumerating eighty-one more which may reasonably be expected to occur. In the prefatory account of previous work on the avifauna of the State no mention is made of the labor of Coues and Yarrow at Fort Macon.

According to Mr. A. C. Smith, the author of a recently issued work upon "The Birds of Wiltshire" (Eng.), the Bustard, which in English popular opinion is always more associated with the Wiltshire Downs or Salisbury Plain than with any other part of the country, became extinct there about the year 1820. There seems, in fact, to be no printed account of its occurrence in Wiltshire after that of Montagu in 1813. The Bustard was not extirpated in Suffolk until 1832, nor Norfolk until 1838.

I. H. Gurney gives in "The Zoologist" a list of eighteen reported occurrences of *Sterna caspica* in Great Britain, the last in 1880. It is readily identified by its red beak.

The land-birds of Fernando Noronha, according to H. N. Ridley, comprise a Dove, a Tyrant, and a Vireo, yet the group of islands is but 194 miles east of Cape San Roque.

MAMMALIA.—It seems, from Mr. Harting's notes in "The Zoologist," that of late years the European mole has extended its range in Great Britain. Writing in 1874, Bell observes that "the mole is not found in the northern extremity of Scotland, nor in the islands of Orkney and Zetland." Alston, writing in 1880, remarks that it was at that date well known in Sutherland and Caithness. Though absent from the island, it is common in Anglesea and in Ayrshire, on the opposite coast. Albino moles are not uncommon.

The only herds of wild white cattle now existing in Great Britain are at the following places: Chartley Park, near Uttoxeter,

Staffordshire (probably enclosed by the middle of the thirteenth century); Chillingham Park, near Belford, Northumberland (possibly enclosed before 1220); Cadzow Park, Lanarkshire; and Somerford Park, near Congleton, Cheshire. Cadzow Park occupies a portion of the old Caledonian Forest. At Blickling and Woodbastwiche, both in Norfolk, offshoots (domesticated) of the herd which once was kept at Middleton Park, Lancashire, still exist. The herd (enclosed at the end of the fourteenth century) at Lyme Park, near Disley, Cheshire, is now extinct. Other herds existed until recently at Colly Deer Park, Ardrossan and Drumlanrig, all in Southwestern Scotland.

Dr. E. L. Trouessart's catalogue of the Carnivora, living and fossil, comprises nearly 700 species. The group is divided into two sub-orders: the Creodonta and the Carnivora Fissipedia, the first of which is arranged under the families Arctocyoniidæ, Mesonychidæ, Hyænodontidæ, Leptictidæ, Oxyænidæ, and Miacidæ. The Canidæ are placed with the Arctoidea, which thus corresponds with the Hypomycteri of Cope.

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## ENTOMOLOGY.<sup>1</sup>

NEW INSTANCES OF PROTECTIVE RESEMBLANCE IN SPIDERS.—Within the past two years two interesting cases of protective resemblance have come under my observation. A small species, *Thomisus aleatorius* Hentz, is remarkable for having the two anterior pairs of legs very long, while the two posterior pairs are very slender and short. The spider is very common on grass. One summer day, while reclining in the shade, I watched an individual of this species as it passed from one culm to another. Soon it ran up the stem a short distance and suddenly disappeared from view. For some time I was greatly puzzled as to the manner of disappearance. Upon close scrutiny I saw the spider clinging with its posterior legs to the stem. Its two anterior legs on each side were approximated and extended outward, forming an angle with the stem, strikingly similar to the angle formed by the spikelets.

An undescribed species of *Cyrtarachne* mimics a snail shell, the inhabitant of which during the summer and fall is very abundant on the leaves of plants in this place. In the species of *Cyrtarachne* the abdomen partly covers the cephalothorax, is very broad at the base, in this species broader than the length of the spider, and rounds off at the apex. When it rests upon the under side of a leaf with its legs retracted it strongly resembles one of these snail

<sup>1</sup> This Department is edited by Prof. J. H. Comstock, Cornell University, Ithaca, N. Y., to whom communications, books for notice, etc., should be sent.